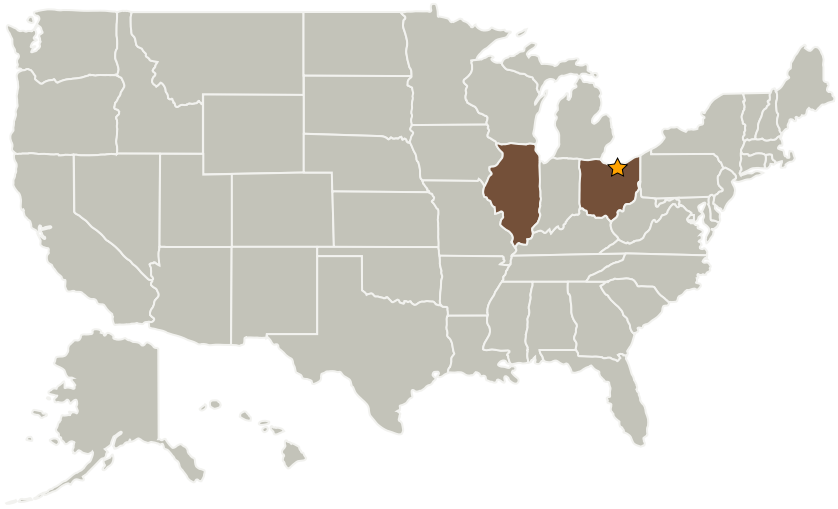
Lightweight InP Solar Cells for Space Applications, Phase I

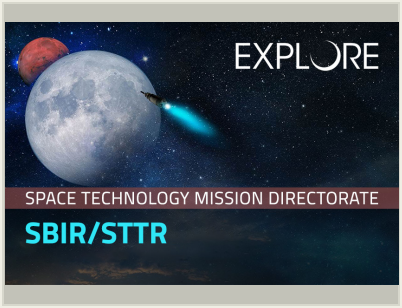
Completed Technology Project (2008 - 2008)

Project Introduction

The innovation in this Phase I SBIR is the development of a technology which will enable the manufacture of a lightweight, low cost, InP based compound semiconductor material containing high efficiency multijunction solar cells suitable for deployment in very high altitude, very long endurance solar aircraft. The key technological step is the application of a production-worthy epitaxial liftoff (ELO) process to a multijunction solar cell structure fabricated on a large area InP substrate. Our focus will be on InP-based solar cells, in particular lattice-matched dual junction solar cell of InP and InGaAsP materials, because of the demonstrated radiation hardness of these materials. We will develop a road map towards InP solar cells capable of >30% conversion efficiency under AM0 illumination. We will also design a process by which thin epitaxial InP solar cell layers will be transferred onto very flexible conductive or non-conductive substrates. The resulting solar cell structures are expected to have a specific power >600 W/kg, to be capable of operating over temperatures in the range -80 ºC to 120 ºC and to have excellent reliability while exposed to space radiation levels

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
MicroLink Devices, Inc.	Supporting Organization	Industry Minority-Owned Business	Niles, Illinois

Primary U.S. Work Locations	
Illinois	Ohio

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Noren Pan

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.1 Power Generation and Energy Conversion
    - TX03.1.1 Photovoltaic